CLAIMS

What is claimed is:

1. A material that can be used for magnetic refrigeration, wherein the material substantially has the general formula

$$(A_yB_{1-y})_{2+\delta}(C_{1-x}D_x)$$

wherein

A is selected from Mn and Co;

B is selected from Fe and Cr;

C and D are different and are selected from P, As, B, Se, Ge, Si and Sb;

x and y each is a number in the range 0-1; and

δ is a number from (-0.1) – (+0.1).

2. A material according to claim 1, wherein at least 90% of A is Mn; at least 90% of B is Fe; at least 90% of C is P; and at least 90% of D is As or Sb.

3. A material according to claim 2, wherein the material has the general formula $MnFe(P_{1-x}As_x)$.

4. A material according to claim 2, wherein the material has the general formula $MnFe(P_{1-x}Sb_x)$.

5. A material according to claim 1, wherein x is a number in the range from 0.3 – 0.6.

6. A material according to claim 1, wherein the material substantially has the general formula $MnFeP_{0.45}As_{0.55}$.

7. A material according to claim 1, wherein if D is As, As is partly replaced with Si and/or Ge.

8. A material according to claim 7, wherein 1 – 40% of the As is replaced with Si and/or Ge.

9. A method for the manufacture of the material according to claim 3, wherein powders of iron arsenide ($FeAs_2$) or iron antimony ($FeSb_2$); manganese phosphide (Mn_3P_2); iron (Fe); and Manganese (Mn) are mixed in suitable quantities to produce a powder mixture that complies with the general formula $MnFe(P_{1-x}As_x)$ or $MnFe(P_{1-x}Sb_x)$ and the powder mixture is subsequently molten under an inert atmosphere and annealed.

10. A method for the manufacture of the material according to claim 1, wherein the same comprises mixing powders of the compounds Fe_2P, $MnAs_2$, Mn and P in suitable weight proportions, grinding the powders to produce a powder mixture complying with the general formula $MnFe(P_{1-x}D_x)$, melting the powder mixture in an inert atmosphere, and annealing the resulting alloy.

11. A method according to claim 10, wherein the powder mixture is sintered at a temperature of approximately 1000°C and the resulting alloy is heated at a temperature of approximately 650°C.

12. A method according to claim 10, wherein the sintering step takes at least approximately one hour and the annealing step takes at least approximately 24 hours.

13. A method according to claim 10, wherein the starting materials are mixed in quantities so as to provide a composition having the formula $MnFeP_{0.45}As_{0.55}$.

14. A method according to claim 10, wherein prior to melting the powder mixture is compressed to a pill.

15. A method according to claim 10, wherein the inert atmosphere is an argon atmosphere.

16. A method according to claim 10, wherein the molten powder mixture is annealed at a temperature in the 750 - 950°C range.

17. A method of using the material according to claim 1 comprising employing the material in magnetic refrigeration in the 250 – 320° K range.

18. A material according to claim 2, wherein at least 95% of A is Mn.

19. A material according to claim 2, wherein at least 95% of B is Fe.

20. A material according to claim 2, wherein at 95% of C is P.

21. A material according to claim 1, wherein at least 95% of D is As or Sb.

22. A material according to claim 8, wherein 10 – 30% of the As is replaced with Si and/or Ge.

23. A material according to claim 22, wherein 17 – 23% of the As is replaced with Si and/or Ge.

24. A material according to claim 23, wherein approximately 20% of the As is replaced with Si and/or Ge.

25. A method according to claim 10, wherein D comprises As and Si and/or Ge.

26. A method according to claim 13, wherein the starting materials are mixed in quantities so as to provide a composition having the formula $MnFeP_{0.45}As_{9.45}(Si/Ge)_{0.10}$.